

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025 (New Syllabus w.e.f 2023-2024)–
SEMESTER & PAPER: I BSC SEMESTER – I Course-1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
NAME OF THE LECTURER: P Ramakrishna Rao, Ch Sundar Singh, MS Ranganayakulu, K Naveen Kumar & VD Sandhya

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August, 2024	02	UNIT II: ESSENTIALS OF PHYSICS: Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective.	Motion of Objects	Mechanics of Particles	6	Yes		PPT Assignment	1 1	Yes Yes	
September, 2024	08	UNIT II: ESSENTIALS OF PHYSICS: Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions-Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe.	Atomic and nuclear particles.	Wave-particle duality, the uncertainty	8	Yes		PPT Assignment	1 1	Yes Yes	

October, 2024	08	UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation.			8	Yes		Assignment	1	YES	
November 2024	08	UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.	Environmental Monitoring and Sustainable Technologies.	Quality Control and Instrumentation	8	Yes		Assignment	1	Yes	

ANNUAL CURRICULAR PLAN II/III/V

YEAR: 2024-2025
SEMESTER & PAPER: I BSC SEMESTER- I PAPER-Course-2 ADVANCES OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
NAME OF THE LECTURER: Dr L Malleswara Rao, V Durga Sandhya, MS Ranganayakulu & K Naveen Kumar

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August, 2024	02	UNIT II: ADVANCES IN PHYSICS: Renewable energy: Generation, energy storage, and energy-efficient materials and devices.	Renewable Energy	Solar energy, wind energy etc	01	YES		Assignment I	1	YES	
September 2024	08	UNIT II: ADVANCES IN PHYSICS: Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.	Quantum dots	biophysics	07	YES		Assignment II Seminar Assignment III	1 hour 1 1 Hour	YES YES YES	

October 2024	08	UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY : Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine, Application of biophysics: Biophysical Imaging.	Application of nanotechnology	Application of nanotechnology:	15	YES		Assignment IV	1 hour	YES	
November 2024	08	UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY Biomechanics, Neurophysics, Application of medical physics: Radiation Therapy, Nuclear medicine Solid waste management, Environmental remediation- Green Technology, Water treatment.	Solid waste management	Water treatment	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025
SEMESTER & PAPER: I BSC SEMESTER- I PAPER- MULTIDISCIPLINARY COURSE (MDC): PRINCIPLES OF PHYSICAL SCIENCES
NAME OF THE LECTURER: MS Ranganayakulu, V Durga Sandhya, M Shankar & K Naveen Kumar

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August 2024	04	UNIT 1: INTRODUCTION TO PHYSICS Nature of Physics: Overview of physics as a discipline, its scope, and its relationship to other sciences. Scientific Method in Physics: Introduction to the scientific method and its application in the study of physics. Measurement and Units: Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements. Scalars and Vectors: Differentiating between scalars and vectors, understanding vector addition and subtraction.	Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements.	Understanding vector addition and subtraction.	01	YES		Assignment I	1	YES	
September, 2024	08	UNIT 2: MECHANICS FOR ARTS STUDENTS Motion and Forces: Introduction to the principles of motion, including velocity, acceleration, and the laws of motion. Energy	Different forms of energy, and the relationship between work and energy.	Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.	08	YES		Assignment II Seminar Assignment III	1 hour 1 1 Hour	YES YES	

		and Work: Understanding the concept of energy, different forms of energy, and the relationship between work and energy. Circular Motion: Exploring the principles of circular motion, centripetal force, and applications in real-world scenarios. Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.								YES	
October 2024	08	UNIT 3: WAVES AND OPTICS FOR ARTS STUDENTS Waves: Understanding the properties and characteristics of waves, including wave types, wave motion, and wave interference. Sound Waves: Exploring the nature of sound waves, including properties of sound, sound propagation, and the Doppler Effect.	characteristics of waves, including wave types,	Doppler Effect	08	YES		Assignment IV	1 hour	YES	
November 2024	08	Light and Optics: Introduction to the behavior of light, reflection, refraction, and the formation of images by mirrors and lenses. Wave Optics: Understanding the principles of interference, diffraction, and polarization of light waves.	Understanding the principles of interference	diffraction, and polarization of light waves	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025

SEMESTER & PAPER: II BSC SEMESTER- III COURSE-5 (Major) COURSE-2 (Minor) OPTICS

NAME OF THE LECTURER: Dr A P V APPA RAO & M S RANGANAYAKULU

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August, 2024	12	Aberrations: Introduction – Monochromatic aberrations: Spherical aberration, methods of minimizing Spherical aberration: Coma, Astigmatism, Distortion and Curvature of field. Chromatic aberration, Achromatic doublet, Achromatism for two lenses when (i) in contact and (ii) separated by a distance.	Distortion and Curvature of field	Aberrations	01	YES					
					01	YES		Assignment I	1	YES	
September, 2024	16	Interference: Principle of superposition – Coherence, Conditions for interference of light, Fresnel’s bi-Prism experiment and determination of wavelength of light –change of phase on Reflection, Oblique incidence of a plane wave on a thin film - Interference due to reflected	Interference by a film with two non-parallel reflecting surfaces	Interference	07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	
								Assignment III	1 Hour	YES	

		light (cosine law) – Colors of thin films -- Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film), Determination of diameter of wire, Newton's rings in reflected light -- Determination of wavelength of monochromatic light, Michelson Interferometer -- Determination of wavelength of monochromatic light.			08	YES		Seminar	1 Hour	YES	
October 2024	16	Diffraction: Introduction, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer Diffraction due to single slit -- Fraunhofer diffraction pattern with N slits (diffraction grating), Resolving power of a Grating, Determination of wavelength of light in normal incidence using diffraction Grating, Fresnel's half period zones -- Area of the half period zones -- Zone plate -- Comparison of Zone plate with Convex lens -- Difference between Interference and Diffraction.	Difference between Interference and Diffraction.	Quarter wave plate, Half wave plate,	15	YES		Assignment IV	1 hour	YES	

November, 2024	08	Polarization: Introduction, Methods of polarization by reflection, refraction, double refraction, Brewster's law, Mauts la, Nicol prism – Construction and working as a Polarizer and Analyzer, Quarter wave plate, Half wave plate, Optical activity, Determination of specific rotation by Laurent's half shade Polarimeter.	Determination of specific rotation by Laurent's half shade Polarimeter	refraction, double refraction	15	Yes		Assignment V	1 hour	YES	
November, 2024	08	Lasers and Holography Lasers: introduction, Spontaneous emission, Stimulated emission, Population Inversion, Laser principle, Einstein Coefficients, Types of lasers: He-Ne laser, Ruby laser, Applications of lasers. Holography: Basic principle of holography, Gabor hologram and its limitations, Applications of holography.	Types of lasers: He-Ne laser, Ruby laser, Applications of lasers.	Lasers and Holography	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025
SEMESTER & PAPER: II BSC SEMESTER- III COURSE-6 (Major) HEAT AND THERMODYNAMICS
NAME OF THE LECTURER: CH SUNDAR SINGH

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August 2024	12	Kinetic theory of gases: Introduction – Deduction of Maxwell’s law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases. Thermodynamics : Introduction – Reversible and irreversible processes – Carnot’s engine and its efficiency – Carnot’s theorem – Second law of thermodynamics, Kelvin’s and Claussius statements – Thermodynamic scale of temperature.	Degrees of freedom Thermodynamic scale of temperature and its identity with perfect gas scale	Transport Phenomena	01	YES					
				Carnot’s engine and it’s efficiency	01	YES		Assignment I	1	YES	
September, 2024	16	Entropy:- Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram. Change of Entropy	.	Change of Entropy of a perfect gas	07	YES		Assignment II Seminar	1 hour 1	YES YES	

		of a perfect gas – Change of entropy when ice changes into steam. Thermodynamic potentials and Maxwell's equations: Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.		Clausius-Clayperon's equation	08	YES		Assignment III Seminar	1 Hour 1 Hour	YES YES	
October 2024	16	Low temperature Physics: Introduction – Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type. Working of refrigerator and Air conditioning machines. Effects of Chloro and Fluro Carbons on Ozone layer.		Adiabatic demagnetization Production of low temperatures	15	YES		Assignment IV	1 hour	YES	

November, 2024	08	Quantum theory of radiation: Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law and Rayleigh-Jeans law from Planck's law - Measurement of radiation – Earth as a Black Body. Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – determination of solar constant, effective temperature of sun.		Disappearing filament optical pyrometer – experimental determination	15	Yes		Assignment V	1 hour	YES	
November, 2024	08	Quantum theory of radiation: Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law and Rayleigh-Jeans law from Planck's law - Measurement of radiation – Earth as a Black Body. Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – determination of solar constant, effective temperature of sun.		Disappearing filament optical pyrometer – experimental determination	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025
SEMESTER & PAPER: II BSC SEMESTER- III COURSE-7 (Major) ELECTRONIC DEVICES AND CIRCUITS
NAME OF THE LECTURER: K NAVEEN KUMAR

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August 2024	12	P-N JUNCTION DIODES : P-N junction Diode, Formation of depletion region, Forward and Reverse bias of Ideal Diode, Tunnel Diode – Construction and working, V-I characteristics and Applications, Zener diode – V-I characteristics, Zener Diode as a Voltage Regulator -- Applications.			01	YES		Assignment I	1	YES	
					01	YES					
September, 2024	16	BI-POLAR JUNCTION TRANSISTOR AND ITS BIASING (D.C) :Transistor construction, Working of PNP and NPN Transistors, CB, CE, and CC Configurations of Transistor, Input and Output Characteristics of CB and CE configurations, Hybrid parameters of a Transistor and equivalent circuit, Bi-Polar Junction Transistor Biasing – Need for stabilization, Biasing methods – Voltage - Divider Bias.	.		07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	
					08	YES		Assignment III	1 Hour	YES	
								Seminar	1 Hour	YES	

October 2024	16	FIELD EFFECT TRANSISTORS & POWER ELECTRONIC DEVICES: Difference between JFET and BJT, Construction and working of JFET, Drain and Transfer Characteristics, MOSFET - Depletion-type, and Enhancement-Type MOSFETs. UJT - Construction, working and V-I characteristics, SCR – Construction, Working and Characteristics.	Difference between JFET and BJT	SCR – Construction, Working and Characteristics.	15	YES		Assignment IV	1 hour	YES	
November, 2024	08	PHOTO ELECTRIC DEVICES: Light-Emitting Diodes (LEDs) - Construction, working, characteristics and Applications, Photo diode - Construction, working characteristics and Applications, Photo-Transistors - Construction, working, characteristics and Applications, Structure and operation of LDR and its Applications.	Photo diode - Construction, working characteristics	LDR and its Applications.	15	Yes		Assignment V	1 hour	YES	
November, 2024	08	POWER SUPPLIES: Rectifiers: Half wave, Full wave and Bridge rectifiers - Efficiency (with derivations), Ripple factor - Filters - Choke input (inductor), L-section, π -section filters. Three terminal fixed voltage IC-regulators (78XX and 79XX).	Half wave, Full wave and Bridge rectifiers	IC- regulators (78XX and 79XX).	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2024-2025

SEMESTER & PAPER: II BSC SEMESTER- III COURSE-8

ANALOG AND DIGITAL ELECTRONICS

NAME OF THE LECTURER: V DURGA SANDHYA

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August 2024	12	OPERATIONAL AMPLIFIERS : a) Concept of feedback in CE amplifier, Negative and Positive feedback, Advantages and Disadvantages of Negative feedback, Basic concepts of differential amplifier, Block diagram of Op-Amp and its equivalent circuit, IC Diagram (IC 741), Ideal voltage transfer curve, Open loop Op-Amp configurations- differential, inverting and non-inverting Op-Amps. b) Voltage Series Feedback Amplifier (Non-Inverting Op amp): Gain and Bandwidth derivations, Voltage Shunt Feedback Amplifier (Inverting Op amp): Gain and Bandwidth derivations	Ideal voltage transfer curve, Open loop Op-Amp configurations	differential, inverting and non-inverting Op-Amps.	01	YES					
				Feedback Amplifier	01	YES		Assignment I	1	YES	

[illegible]

November, 2024	08	SEQUENTIAL LOGIC CIRCUITS & CODE CONVERTERS: a) Combinational Logic vs Sequential Logic Circuits, Sequential Logic circuits: Flip-flops, Basic NAND, NOR Latches, Clocked SR Flip-flop, JK Flip-flop, D Flip-flop, Master-Slave Flip- flop, Conversion of Flip flops. b) Code Converters: BCD to Decimal Converter, BCD to Gray Code Converter, BCD to 7 segment Decoders	Flip-flops, BCD to Gray Code Converter,	Conversion of Flip flops Code Converters	15	Yes		Assignment V	1 hour	YES	
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ANNUAL CURRICULAR PLAN I/III/V

YEAR: **2024-2025**
SEMESTER & PAPER: **III BSC SEMESTER – V PAPER-VI Title: LOW TEMPERATURE PHYSICS & REFRIGERATION**
NAME OF THE LECTURER: **M S Ranganayakulu**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August, 2024	09	UNIT-I PRODUCTION OF LOW TEMPERATURE Production of low temperatures- Introduction, Joule-Thomson effect, Regenerative cooling, Different methods of liquefaction of gases, liquefaction of air- Claude’s method, Production of liquid hydrogen and Helium-Kapitza’s method , Adiabatic demagnetization, Properties of materials at low temperatures, Superconductivity (qualitative treatment only). UNIT-II MEASUREMENT OF LOW TEMPERATURE Gas thermometer and its correction and calibration, Secondary thermometers, resistance thermometers, thermocouples, Vapour pressure thermometers, Magnetic thermometers, Advantages and drawbacks of each type of thermometer.	Helium-Kapitza’s method	Joule-Thomson effect, Regenerative cooling, Different methods of liquefaction of gases.	01	YES		Assignment	1	YES	
September 2024	12	UNIT-III PRINCIPLES OF REFRIGERATION Introduction to Refrigeration- Natural and	applications of Refrigeration	Types of	01	YES		Assignment	1	YES	

		artificial refrigeration , Stages of refrigeration, Types of refrigeration -Vapor compression and vapor absorption refrigeration systems, Refrigeration cycle and explanation with a block diagram, applications of Refrigeration Introductory ideas on air-conditioning (qualitative treatment only). Refrigerants-Introduction, Ideal refrigerant, Properties of refrigerant, Requirement of refrigerants, Selection of refrigerants , Classification of refrigerants, commonly used refrigerants, Eco-friendly refrigerants.	Requirement of refrigerants, Selection of refrigerants	refrigeration - Vapor compression and vapor absorption refrigeration systems,							
October 2024	12	UNIT-IV COMPONENTS OF REFRIGERATOR Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration (TR) and Energy Efficiency Ratio (EER), Refrigerator components: Types of compressors, evaporators and condensers, differences between Heat engine and refrigerator , Refrigerant leakage and detection.	differences between Heat engine and refrigerator,	Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration (TR) and Energy	01	YES		Assignment	01	YES	
November 2024	06	UNIT-V APPLICATIONS OF LOW TEMPERATURE & REFRIGERATION Applications of Low temperatures: Preservation of biological material, Food freezing, liquid nitrogen and liquid hydrogen in medical field, Superconducting magnets in MRI. Applications of refrigeration: Domestic refrigerators, Water coolers, Cold storages, Ice plants, Food preservation methods, Chemical and Process industries, Cold treatment of metals.		Preservation of biological material, Food freezing,	01	YES		Seminar Assignment	01 01	YES YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2023-2024

SEMESTER & PAPER: III BSC SEMESTER – V PAPER-VII Title: SOLAR ENERGY AND APPLICATIONS

NAME OF THE LECTURER: P Rama Krishna Rao

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
August 2024	9	Unit - I: BASIC CONCEPTS OF SOLAR ENERGY (10hrs) Spectral distribution of solar radiation, Solar constant , zenith angle and Air-Mass, standard time, local apparent time, equation of time, direct, diffuse and total radiations. Prediction of available solar radiation, Solar energy-Importance and global warming, Storage of solar energy, Solar pond. Pyrheliometer - working principle, direct radiation measurement, Pyrometer-working Principle, diffuse radiation measurement, Distinction between the two meters.	Prediction of available solar radiation, Solar energy-Importance and global warming, Storage of solar energy, Solar pond.	Pyrheliometer - working principle, direct radiation measurement,	9	Yes		Assignment I	1	Yes	
								Student seminar I	1	Yes	
September 2024	12	Unit - II: SOLAR THERMAL COLLECTORS (10hrs) Solar Thermal Collectors -Introduction, Types of Thermal collectors, Flat plate collector – liquid heating type, Energy balance equation and efficiency, Solar Thermal Power Plant Evacuated tube collector, Definitions of collector efficiency, Testing of flat-plate collector, solar water heating system, natural and forced circulation types. Concentrating	Solar Thermal Power Plant	Types of Thermal collectors, Flat plate collector – liquid heating type, Energy balance equation and efficiency,	12	Yes Yes		Assignment II	1	Yes	
								PPT I	1	Yes	
								Assignment III	1	Yes	
								Career Guidance Class	1	Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2024-2025 (New Syllabus w.e.f 2023-2024)
SEMESTER & PAPER: I BSC SEMESTER – II– COURSE 3 (Major) Course 1(Minor): MECHANICS AND PROPERTIES OF MATTER
NAME OF THE LECTURER: Ch Sundar Singh & VD Sandhya

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December 2024	12	UNIT-I VECTOR ANALYSIS Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.	Precession of atom and nucleus in magnetic field	Mechanics of Particles	6	Yes		PPT	1	Yes	
								Assignment	1	Yes	
January 2025	16	UNIT-II MECHANICS OF PARTICLES Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.	Motion of satellites.		8	Yes		PPT	1	Yes	
								Assignment	1	Yes	

		UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA 9hrs Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.	Precession of a top, Gyroscope, Precession of the equinoxes.		8	Yes		PPT Student seminars	1 1	Yes Yes	
February, 2025	16	UNIT-IV CENTRAL FORCES Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites.		Motion in a Central Force Field	8	Yes		Assignment	1	YES	
March, 2025	08	UNIT-V SPECIAL THEORY OF RELATIVITY Galilean relativity, Absolute frames. Michelson-Morley experiment, the negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.	Absolute frames.	Lorentz transformation, time dilation	8	Yes		Assignment	1	Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2024-2025

SEMESTER & PAPER: I BSC SEMESTER- II PAPER- COURSE 4 (Major): WAVES AND OSCILLATIONS

NAME OF THE LECTURER: Ch Sundar Singh

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December, 2024	12	UNIT-I SIMPLE HARMONIC OSCILLATIONS Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum-measurement of ‘g’, Principle of superposition, beats, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.	Physical characteristics of SHM,	compound pendulum-measurement of ‘g’,	01	YES					
					01	YES		Assignment I	1	YES	
January, 2025	16	UNIT-II DAMPED AND FORCED OSCILLATIONS Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator,	Damped harmonic oscillator, solution of the differential equation of damped oscillator	differential equation of forced oscillator	07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	
								Assignment III			

		logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance. UNIT-III COMPLEX VIBRATIONS Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.	triangular wave	evaluation of Fourier coefficients	08	YES		Seminar	1 Hour	YES	
February 2025	16	UNIT-IV VIBRATING STRINGS AND BARS Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy transport and transverse impedance. Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends (ii) bar fixed at the midpoint (iii) bar fixed at one end. Tuning fork.	Energy transport and transverse impedance.	Transverse wave propagation along a stretched string	15	YES		Assignment IV	1 hour	YES	

March 2025	08	UNIT-V ULTRASONICS Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magnetostrictive methods, detection of ultrasonics, determination of wavelength of ultrasonic waves. Applications and uses of ultrasonic waves.	determination of wavelength of ultrasonic waves	production of ultrasonics by piezoelectric and magnetostrictive methods,	15	Yes		Assignment V	1 hour	YES	
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ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2024-2025
SEMESTER & PAPER: II BSC SEMESTER-IV COURSE 9 (Major), Course 3 (Minor) : ELECTRICITY, MAGNETISM AND ELECTRONICS
NAME OF THE LECTURER: P Ramakrishna Rao & M S Ranganayakulu

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December 2024	12	Electrostatics: (6hrs) Gauss’s law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb’s law from Gauss law, Electrical potential–Equipotential surfaces, Potential due to a (i) dipole (ii)uniformly charged sphere 2. Dielectrics: Dielectrics-Polar and Non-polar dielectrics-Effect of electric field on dielectrics, Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P, Relation between D, E and P, Dielectric constant and electric susceptibility.		Electrostatics	8	YES		Assignment I	1	YES	
				Dielectrics	6	YES		Assignment II	1	yes	
January	12	3. Magnetostatics: Biot-Savart’s law and its applications: (i)	Divergence and curl of	Magnetostatics	10	YES		Assignment-III	01 Hour	YES	

2025		circular loop and (ii) solenoid, Divergence and curl of magnetic field, Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications. 4. Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, Self induction and Mutual induction, Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field, Eddy currents and Electromagnetic damping. 5. Alternating currents: Alternating current - Relation between current and voltage in LR and CR circuits, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q -factor, Power in ac circuits, Power factor.	magnetic field,	Moving charges in electric and magnetic fields	8	YES		Seminar	02 Hours	YES	
				Electromagnetic Induction	4	YES		Assignment IV	01 Hour	YES	
February 2025	12	6. Electromagnetic waves-Maxwell's equations: Idea of displacement current, Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement only). Basic Electronic devices: PN junction diode, Zener diode and Light Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator-Transistors and its operation, CB, CE and CC configurations, Input and output	Hybrid parameters, Determination of hybrid parameters from								

		characteristics of a transistor in CE mode, Relation between alpha, beta and gamma; Hybrid parameters, Determination of hybrid parameters from transistor characteristics ; Transistor as an amplifier.	transistor characteristics								
March, 2025	12	Digital Electronics: (12 hrs) Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.		Digital electronics	6	YES		Assignment V	1	YES	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2024-2025

SEMESTER & PAPER: II BSC SEMESTER - IV COURSE 10 (Major), Course 4 (Minor) : MODERN PHYSICS

NAME OF THE LECTURER: DR APV APPARAO, K Naveen Kumar

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December 2024	12	Atomic and Molecular Physics : Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules , Fine structure of Sodium D-lines, Zeeman effect, Experimental arrangement to study Zeeman effect; Raman effect, Characteristics of Raman effect, Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect	Spectral terms and spectral notations, Selection rules, Intensity rules		09	Yes		Assignment I	1	Yes	
January, 2025	12	2. Matter waves & Uncertainty Principle: Matter waves, de Broglie’s hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer’s experiment, Phase and group velocities (Qualitative treatment), Heisenberg’s uncertainty principle for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a	Bohr’s principle of complementarity.		09	Yes		Student seminar I Assignment II	1	Yes	

		single slit) and photons (Gamma ray microscope), Bohr's principle of complementarity. Quantum (Wave) Mechanics : Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height (Infinite Potential Well) and (ii) one dimensional harmonic oscillator	one dimensional harmonic oscillator		09	Yes		Assignment III	1	YES	
February 2025	12	4. Nuclear Physics : (12 hrs) Nuclear Structure: General Properties of Nuclei, Mass defect, Binding energy; <i>Nuclear forces:</i> Characteristics of nuclear forces- Yukawa's meson theory; <i>Nuclear Models:</i> Liquid drop model, The Shell model, Magic numbers; <i>Nuclear Radiation detectors:</i> G.M. Counter, Cloud chamber, Solid State detector; <i>Elementary Particles:</i> Elementary Particles and their classification. UNIT-V: 5. Nano materials :(7hrs) Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene (Mention of structures and properties), Distinct properties of nano materials (Mention-<i>mechanical, optical, electrical, and magnetic properties</i>); Mention of applications of nano materials: (<i>Fuel cells, Phosphors for HD TV,</i>	Characteristics of nuclear forces- Yukawa's meson theory		09	Yes		PPT Assignment IV Career Guidance Class	1 1 1	Yes YES Yes	

		<i>Next Generation Computer chips, elimination of pollutants, sensors) .</i>									
March 2025	06	6. Superconductivity: (5 hrs) Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect , Isotope effect, Type I and Type II superconductors, BCS theory (elementary ideas only) , Applications of superconductors.	BCS theory (elementary ideas only),		09	Yes		PPT seminar Career Guidance Class Assignment V	1 1 1 1	Yes Yes Yes Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2024-2025

SEMESTER & PAPER: II BSC SEMESTER - IV COURSE 11 (Major) : INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS

NAME OF THE LECTURER: DR L MALLESWARA RAO

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December 2024	12	INTRODUCTION TO NUCLEAR PHYSICS: Nuclear Structure: General Properties of Nuclei, Mass defect, Binding energy; Nuclear forces: Characteristics of nuclear forces- Nuclear Models-Liquid drop model-Semi empirical mass formula, nuclear shell model.	Semi empirical mass formula	Liquid drop model	09	Yes		Assignment I	1	Yes	
January, 2025	12	ELEMENTARY PARTICLES AND INTERACTIONS: Discovery and classification of elementary particles, properties of leptons, mesons and baryons; Types of interactions-strong, electromagnetic and weak interactions; Conservation laws – Isospin, parity, charge conjugation. NUCLEAR REACTIONS AND NUCLEAR DETECTORS: Nuclear Reactions: Types of reactions, Conservation Laws in nuclear reactions, Reaction energetic, Threshold energy, nuclear cross-section; Nuclear detectors: Geiger-Muller counter, Scintillation counter, Wilson’s cloud chamber.	Types of interactions	Conservation laws – Isospin, parity, charge conjugation.	09 09	Yes Yes		Student seminar I Assignment II Assignment III	1 1	Yes YES	
February	12	NUCLEAR DECAYS AND NUCLEAR	Conservation	Nuclear	09	Yes		PPT	1	Yes	

2025		ACCELERATORS: Nuclear Decays: Gamow's theory of alpha decay, Fermi's theory of Beta- decay, Energy release in Beta-decay, selection rules. Nuclear Accelerators: Types-Electrostatic and electrodynamics accelerators; Cyclotron-construction, working and applications; Synchrocyclotron-construction, working and applications.	Laws in nuclear reactions	detectors		Yes		Assignment IV Career Guidance Class	1 1	YES Yes	
March 2025	06	APPLICATIONS OF NUCLEAR AND PARTICLE PHYSICS: Medical Applications: Radiation therapy and imaging techniques, nuclear energy: nuclear reactors and power generation, Particle physics in high-energy Astrophysics.	Energy release in Beta-decay	Electrostatic and electrodynamics accelerators	09	Yes		PPT seminar Career Guidance Class Assignment V	1 1 1 1	Yes Yes Yes Yes	

